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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,393	08/22/2003	Barbara F. Smith	4250.2.4	9737

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EXAMINER

DRODGE, JOSEPH W

ART UNIT	PAPER NUMBER
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1723

DATE MAILED: 10/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/646,393	SMITH ET AL.	
	Examiner	Art Unit	
	Joseph W. Drodge	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 21 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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Claims 48-51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 48 is incomplete since the body of the claim is silent as to any step involving "perchloric acid" mentioned in the preamble.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-10,12,13,16-29,32,32,35-37 and 48-50 are rejected under 35 U.S.C. 102(b) as being anticipated by Davis et al patent 4,770,784. Davis et al discloses selective separation of target small molecules, as well as metal ion molecules from aqueous solutions [the instant Specification, pg. 5 defines "small molecules" as any molecules other than metals or metal ions] through the action of a water-soluble polymer, such as polyethyleneimine, having binding or chelating groups, (column 6, lines 16-31 and column 5, lines 4-15) by passing solution through an ultrafiltration membrane which retains the polymer/molecule complex and passes the water and non-bound molecules (figure 1 and column 7, lines 26-38, etc.). Column 7, lines 37-38 is indirectly identifying the membrane that separates complexed and non-complexed material as an ultrafiltration membrane, by identifying downstream membrane 21 as an ultrafiltration unit with same membrane substance as first membrane.

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Davis et al also disclose the ultrafiltration membrane having a molecular weight cutoff less than that of the water soluble polymer to aid separation (claim 2 of Davis and also Table I of columns 5-6).

Regarding claim 20, as well as dependent claims 3,5-7,24-26 and 50, etc. the bound material can be released or stripped from the affinity adsorbent in downstream steps (column 7, lines 54-61). Also disclosed are pre-purifying the adsorbent polymer to be comprised of a selected polymer size range by way of grinding the adsorbent material to a relatively uniform smaller particle size, yet of a particle size precluding their passage through the pores of the membrane employed for separation (column 5, lines 16-20).

For claims 48-50, adsorbing of chromate, a compound related to "chromic acid" is identified at column 6, line 34, etc.

For other dependent claims, also disclosed are initially dissolving the polymeric adsorbent in a solution (column 5, line 66-column 6, line 15), mixing step (column 7, lines 21-23), selecting the target small molecule from the large Markush groups of claims 4,8, 23 and 27 at column 6, lines 15-19 and 28-31 (see especially "organic species such as organic and biological solutes" and "a wide variety of organic and biological materials including amino acids..."). For claims to "affinity groups", see column 5, lines 14-15 "chelation behavior" and lines 27-29 "to which has been attached a chelating functional group".

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 11,14,15,30,33,34 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis et al patent 4,770,784 in view of Smith et al patent 5,891,956.

Claims 11 and 30 differ in requiring at least one of polyethyleneimine with particular attached functional groups. However, Smith et al in various examples teach

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polyethyleneimine with various functional groups containing molecules with OH, N and =O atoms. It would have been obvious to one of ordinary skill in the art to have modified the Davis et al method by incorporating polyethyleneimine with the functional groups of Smith et al, to selectively adsorb particular, specific organic and biological molecules.

Claims 14,15,33 and 34 differ in requiring binding groups that may constitute a diol, thiol or tartrate containing group, amongst others, such groups being taught by Smith et al in examples including example 26. It would have been obvious to one of ordinary skill in the art to have practiced the Davis et al method, by utilizing a polyethyleneimine compound with such group, as taught by Smith et al, because of their superior binding capacity for certain specific biological compounds or molecules.

Claims 38-43 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis et al patent 4,770,784 in view of Yamasaki et al patent 6,896,800. Claim 38 differs in requiring at least one of the molecules selected to be from a group comprising arsenic acid. Davis et al does disclose treatment of wastewater from metal processing industries and including anions, cations and complexes (column 6, lines 16-28).

Yamasaki et al teach that arsenic acid may be selectively removed or concentrated by ultrafiltration processes in treatment of wastewater. It would have been obvious to one of ordinary skill in the art to have utilized the Davis et al process to treat wastewater having contaminants including arsenic acid and related chemicals, since Yamasaki teaches them to be common contaminant from various types of wastewater, especially metal processing industries requiring removal from the effluent.

Claims 44-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis et al in view of Yamasaki et al as applied to claim 38 above, and further in view of Smith et al patent 5,891,956.

Claims 45 and 46 differ in requiring at least one of polyethyleneimine with particular attached functional groups. However, Smith et al in various examples teach polyethyleneimine with various functional groups containing molecules with OH, N and =O atoms. It would have been obvious to one of ordinary skill in the art to have modified the Davis et al method by incorporating polyethyleneimine with the functional groups of Smith et al, to selectively adsorb particular, specific organic and biological molecules.

Claim 44 differs in requiring binding groups that may constitute a diol, thiol or tartrate containing group, amongst others, such groups being taught by Smith et al in examples including example 26. It would have been obvious to one of ordinary skill in the art to have practiced the Davis et al method, by utilizing a polyethyleneimine compound with such group, as taught by Smith et al because of their superior binding capacity for certain specific biological compounds or molecules.

ARGUMENTS

Applicant's arguments filed on September 21, 2005 have been fully considered but they are not persuasive. It is argued that neither Davis et al or the other applied references disclose use of an ultrafiltration membrane having a molecular weight cutoff value that is less than the adsorbing water soluble polymer employed. In fact, Davis et al explicitly discloses such limitation in claim 2 as well as Table I spanning columns 5-6.

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With respect to claims 38-43 and 47, it is argued that the formerly applied references lack teaching of any of the target molecules from the revised, narrowed Markush group. However, Yamasaki et al teach that arsenic acid and related arsenic compounds are readily separated by ultrafiltration processes from wastewater derived from metal working processes.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Drodge at telephone number 571-272-1140. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda Walker, can be reached at 571-272-1151. The fax phone number for the examining group where this application is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either private PAIR or Public PAIR, and through Private PAIR only for unpublished applications. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JWD

October 25, 2005

Joseph Drodge
JOSEPH DRODGE
PRIMARY EXAMINER